

ABSTRACT OF THE INVENTION

Methods for converting hydrocarbon fuels to hydrogen-rich reformat that incorporate a carbon dioxide fixing mechanism into the initial hydrocarbon
5 conversion process. The mechanism utilizes a carbon dioxide fixing material to remove carbon dioxide from the reformat product stream. The removal of carbon dioxide from the product stream shifts the reforming reaction equilibrium toward higher hydrocarbon conversion with only small amounts of carbon oxides produced. Repeated absorption/desorption of carbon dioxide by the fixing materials tends to
10 decrease the fixing capacity of the materials. Hydration of the carbon dioxide fixing materials between one or more cycles serves to sustain their fixing capacity and to enhance the efficiencies of the reforming and shift reactions occurring in the catalyst bed. Hydration can occur during reactor start-up or shut down, periodically over a number of cycles, and/or upon a monitored change in the reformat composition.